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Three new species of *Cybaeus* L. Koch, 1868 (Aranei: Cybaeidae) from the Maritime Province of Russia

Три новых вида пауков рода *Cybaeus* L. Koch, 1868 (Aranei: Cybaeidae) из Приморского края

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KEY WORDS: Araneae, Far East Asia, new species.

КЛЮЧЕВЫЕ СЛОВА: Araneae, Дальний Восток, новый вид.

ABSTRACT. A survey of Cybaeidae in Far East Russia revealed three additional species new to science: *Cybaeus oligerae* sp.n. (♂), *C. logunovi* sp.n. (♂) and *C. maritimus* sp.n. (♂). The new species are described and illustrated in detail.

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РЕЗЮМЕ. В результате исследования пауков из семейства Cybaeidae, собранных в Приморском крае, были обнаружены 3 новых для науки вида *Cybaeus oligerae* sp.n. (♂), *C. logunovi* sp.n. (♂) и *C. maritimus* sp.n. (♂). Новые виды описаны и детально проиллюстрированы.

Introduction

Cybaeidae is a medium-sized family with 303 nominal species distributed in the Holarctic and Neotropics [WSC, 2022]. *Cybaeus* L. Koch, 1868 is the most speciose genus of the family, encompassing 195 species [WSC, 2022]. This genus has an exclusively Holarctic distribution, with the exception of *C. signatus* Keyserling, 1881, which is described from Peru based on females and is most probably misplaced. The highest species diversity of the genus occurs in Japan with 92 named species [WSC, 2022]. Most *Cybaeus* species have limited distribution ranges.

The first *Cybaeus* species from Russia were reported by Marusik & Logunov [1991], who described three new species, namely *C. bam*, *C. basarukini* and *C. kunashirensis* from Sakhalin Area. Later, two more species were found in the country, both collected from the Russian Far East: *C. confrantis* Oliger, 1994 (Maritime Province: Oliger [1994]) and *C. striatipes* Bösenberg et Strand, 1906 (Sakhalin Area: Marusik & Crawford [2006]). Finally, three species, *C. fushun* Lin et Li, 2021 and *C. huadian* Lin et Li, 2021 previously known from China, and *C. mikhailovi* Marusik et Omelko, 2021 were recently reported from the Maritime province [Marusik, Omelko, 2021].

While studying the material collected in Maritime Province, we found three more species of *Cybaeus* which do not conform to any known species; these species are described as new to science herein.

Material and methods

Specimens were photographed in dishes of different sizes with paraffin on the bottom (different size holes were made in the bottom to keep specimens in the desired position), using an Olympus Camedia C-5050 camera attached to an Olympus SZX12 stereomicroscope at the Zoological Museum of the University of Turku, and a Nikon DS-Ri2 camera attached to a Nikon SMZ25 stereomicroscope at the Laboratory of Ecology and Evolutionary Biology of Aquatic Organisms, the Far Eastern Federal University. The images were montaged using “CombineZP” and “Zerene Stacker” image stacking software programs.

All measurements are given in millimeters. In all cases, holotype specimens were measured. Description of somatic characters (excepts for size) are given briefly, as they have little taxonomic importance in distinguishing sibling species.

Material treated here was partly collected during the Finnish-Russian expedition to Maritime Province in 1998,

by Seppo Koponen and Yuri Marusik. Some specimens were collected by Yuri Sundukov and the second author.

Depositories: ZMMU — Zoological Museum, Moscow State University; ZMUT — Zoological Museum, University of Turku.

Abbreviations used in the text and figure plates: *Ac* — anterior arm of conductor, *C* — conductor, *Ct* — teeth of conductor, *E* — embolus, *Pa* — patellar apophysis, *Pc* — posterior arm of conductor, *Pd* — dorsal part of patellar apophysis, *Pv* — ventral part of patellar apophysis, *Rta* — retrolateral tibial apophysis, *Sd* — sperm duct, *Ti* — tegulum's margin incisions.

Genus *Cybaeus* L. Koch, 1868

Type species: *Amaurobius tetricus* C.L. Koch, 1839 from Germany.

COMMENTS. So far, eight species of *Cybaeus* are known in the West Palaearctic [WSC, 2022] of them only one is known from Russia in northern Caucasus. The Far East Palaearctic has the highest species diversity of the genus; the same is true for the Russian Far East, which encompasses eight named species from Sakhalin Area (4) and Maritime Province (4). Eight species of the genus are recorded in China; more than half of them (5 species) are known only from the original description. Most of the Chinese species are known from the northeastern part of the country (Jilin and Liaoning provinces), and one species (*C. desmaeus* Zhu et Wang, 1992) is recorded from Anhui Province. The genus is well revised in Japan only.

Although the genus has high species diversity in the Far East and particularly in Japan, it was not split into species groups; the Japanese species were categorized by Ihara [2004] into three size groups: large, medium, and small.

Species survey

Cybaeus oligerae sp.n.

Figs 1–4, 13, 16–18, 25, 26.

MATERIAL: Holotype ♂ (ZMMU), Maritime Prov., Gorno-tayozhnoye Vil., 43°41′N 132°9′53″E, 16.07.2007 (M.M. Omelko). Paratypes: 1♂ (ZMUT), same place and collector, 20.07.2007; 1♂ (ZMUT), Maritime Prov., Lazovskii Res., Sukhoi Stream, 11–20.06.2002 (Yu.N. Sundukov); 13♂♂ (ZMUT), Maritime Prov., unknown locality, no habitat and collector data.

ETYMOLOGY. The specific name is a patronym in honor of our colleague Tatyana I. Oliger (Lodeinoye Pole, Russia) who made big contribution in study of spiders of the Russian Far East and described the first *Cybaeus* from Maritime Province.

NOTE. The species belongs to the medium-sized group, according to Ihara [2004].

DIAGNOSIS. It is most similar to *C. logunovi* sp.n. and *C. maritimus* sp.n. from which it can be distinguished by larger size (see Table 4) and tip of cymbium longer than bulb (*vs*. shorter; *cf*. Fig. 2 and 6, 10).

DESCRIPTION. Male (holotype). Total length 9.02. Carapace: 5.19 long, 3.62 wide. Carapace/femur I length ratio 0.75. Carapace dark or light brown with pattern; pattern poorly visible in some specimens (Fig. 1). Chelicerae, endites and labium brown. Sternum light brown. Chelicerae with 2 large and 6 smaller teeth (Fig. 13). For spination of leg I see Table 5. Legs with annulations.

Abdomen dorsally gray with brown cordiac mark and pattern, consisting of series of light brown spots (poorly visible in some specimens). Lateral sides and the venter of the abdomen brown.

Male palp as in Figs 2–4, 16–18. Femur length/width ratio 5.19. Femur length/cymbium length ratio 1.03. Patella with subdivided apophysis (*Pa*), ventral part (*Pv*) conical, dorsal part (*Pd*) small with a number of short, thick spines. Tibia shorter than patella with ridge-like *Rta*. Cymbium long, length/width ratio 2.71, with terminal part slightly longer than bulb and retrolateral fold about 1/5 of cymbium length. Bulb oval, 1.25 times longer than wide, 2.2 times shorter than cymbium. Dorso-retrolateral part of tegulum with undulated margin, with 3 distinct incisions (*Ti*, Fig. 17). Anterior arm (*Ac*) of conductor short, terminates at about 1 o'clock position, posterior arm (*Pc*) short and solid, its tip mesoventrally bent with strong teeth posteriorly (*Ct*, Fig. 16). Embolus wide, almost as wide as anterior part arm of conductor, gradually tapering with pointed tip, originates at about 11:30 o'clock position and terminates at about 4 o'clock position.

Female. Unknown.

DISTRIBUTION. Maritime Province of Russia only (Figs 25–26).

Cybaeus logunovi sp.n.

Figs 5–8, 14, 19–21, 25, 26.

MATERIAL: Holotype 1♂ (ZMMU), Maritime Prov., Gorno-tayozhnoye Vil., 43°41′N 132°9′53″E, 12.07.2007 (M.M. Omelko).

ETYMOLOGY. The specific name is a patronym in honor of our friend and colleague Dmitri V. Logunov (Manchester, UK), who made significant contributions to the study of Siberian and Far Eastern spiders.

DIAGNOSIS. The new species differs from the sibling *C. oligerae* sp.n. by the smaller size of carapace (3.56 *vs*. 5.19) and shorter tip of cymbium (terminal part of cymbium in *C. logunovi* sp.n. is shorter that bulb *vs*. as long as bulb; *cf*. Fig. 2 and 6). *Cybaeus logunovi* sp.n. differs from *C. maritimus* sp.n. by the smaller size of body, carapace and palp, and having 1 prolateral spine on tibia I (*vs*. 2) and 2 shallow retrolateral incisions of tegulum (*Ti*) (*vs*. 3, deep; *cf*. Fig. 20 and 23).

DESCRIPTION. Male. Total length 7.07. Carapace: 3.56 long, 2.36 wide. Carapace/femur I length ratio 0.92. Carapace brown (cephalic area dark brown) with pattern (Fig. 5).

Table 1. Measurements of legs of *Cybaeus oligerae* sp.n. male.
Таблица 1. Промеры ног самца *Cybaeus oligerae* sp.n.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	6.92	1.97	8.01	8.02	2.5	27.42
II	6.49	1.81	7.19	7.2	2.8	25.49
III	4.66	1.59	4.33	5.19	2.06	17.83
IV	5.11	1.4	5.06	6.63	2.65	20.85



Figs 1–12. Male holotypes of *Cybaeus oligerae* sp.n. (1–4), *C. logunovi* sp.n. (5–8) and *C. maritimus* sp.n. (9–12). 1, 5, 9 — general appearance; 2, 6, 10 — palp, ventral; 3, 7, 11 — same, retrolateral; 4, 8, 12 — same, dorsal. Scale: 1 mm.

Abbreviations: *Ac* — anterior arm of conductor, *C* — conductor, *E* — embolus, *Pa* — patellar apophysis, *Pc* — posterior arm of conductor, *Pd* — dorsal part of patellar apophysis, *Pv* — ventral part of patellar apophysis, *Rta* — retrolateral tibial apophysis.

Рис. 1–12. Голотипы *Cybaeus oligerae* sp.n. (1–4), *C. logunovi* sp.n. (5–8) и *C. maritimus* sp.n. (9–12). 1, 5, 9 — внешний вид; 2, 6, 10 — пальпа, вентрально; 3, 7, 11 — то же, ретролатерально; 4, 8, 12 — то же, дорзально. Масштаб: 1 мм.

Сокращения: *Ac* — передняя ветвь кондуктора, *C* — кондуктор, *E* — эмболюс, *Pa* — отросток колена, *Pc* — задняя ветвь кондуктора, *Pd* — дорзальная часть отростка колена, *Pv* — вентральная часть отростка колена, *Rta* — ретролатеральный отросток голени.



Figs 13–15. Chelicerae of the male holotypes of *Cybaeus oligerae* sp.n. (13), *C. logunovi* sp.n. (14) and *C. maritimus* sp.n. (15). Scale: 1 mm.

Рис. 13–15. Хелицеры голотипов *Cybaeus oligerae* sp.n. (13), *C. logunovi* sp.n. (14) и *C. maritimus* sp.n. (15). Масштаб: 1 мм.

Chelicerae uniformly dark brown. Endites, labium and sternum light brown. Sternum light brown. Chelicerae with 8 teeth (Fig. 14). For spination of leg I see Table 5. Legs with annulations.

Abdomen dorsally gray with brown and barely visible cardiac mark and pattern, consisting of light gray spots; lateral sides gray with number of irregular light gray spots; the venter of the abdomen light gray.

Palp as in Figs 6–8, 19–21. Femur length/width ratio 4.28. Femur length/cymbium length ratio 0.96. Patella with subdivided apophysis (*Pa*); ventral part (*Pv*) thin, rounded on the tip, dorsal part (*Pd*) small, with short spines. Tibia subequal in length to patella with ridge-like *Rta*. Cymbium moderately long, length/width ratio 2.41, its terminal part shorter than length of bulb. Bulb oval, 1.32 times longer than wide, 1.87 times shorter than cymbium. Tegulum with 2 shallow incisions retrolaterally (*Ti*, Fig. 20). Anterior arm of conductor (*Ac*) short, terminates at about 1–1:15 o'clock position, posterior arm (*Pc*) short and solid, its tip mesoventrally bent with tiny teeth posteriorly (Fig. 19). Embolus wide, almost as wide as anterior part arm of conductor, gradually tapering with pointed tip, originates at about 11:30 o'clock position and terminates at about 4 o'clock position.

Female. Unknown.

DISTRIBUTION. Maritime Province of Russia only (Figs 25–26).

Cybaeus maritimus sp.n.
Figs 9–12, 15, 22–26.

MATERIAL: Holotype ♂ (ZMMU), Maritime Prov., S part Chuguyevka Field Station, ca 43°50′N 134°15′E, 31.07–5.08.1998 (S. Koponen). Paratypes: 9♂♂, same place, summer 1991 (unknown collector).

ETYMOLOGY. The species name refers to the type locality, Maritime Province.

DIAGNOSIS. *Cybaeus maritimus* sp.n. differs from *C. oligerae* sp.n. by the shorter tip of cymbium (cymbium length/tip length ratio 2.38 *vs*. 2.11). The new species can be distinguished from *C. logunovi* sp.n. by the larger size of carapace (4.14 *vs*. 3.56) and having 2 prolateral spines on tibia I (*vs*. 1) and 3 retrolateral tegular incisions (*vs*. 2).

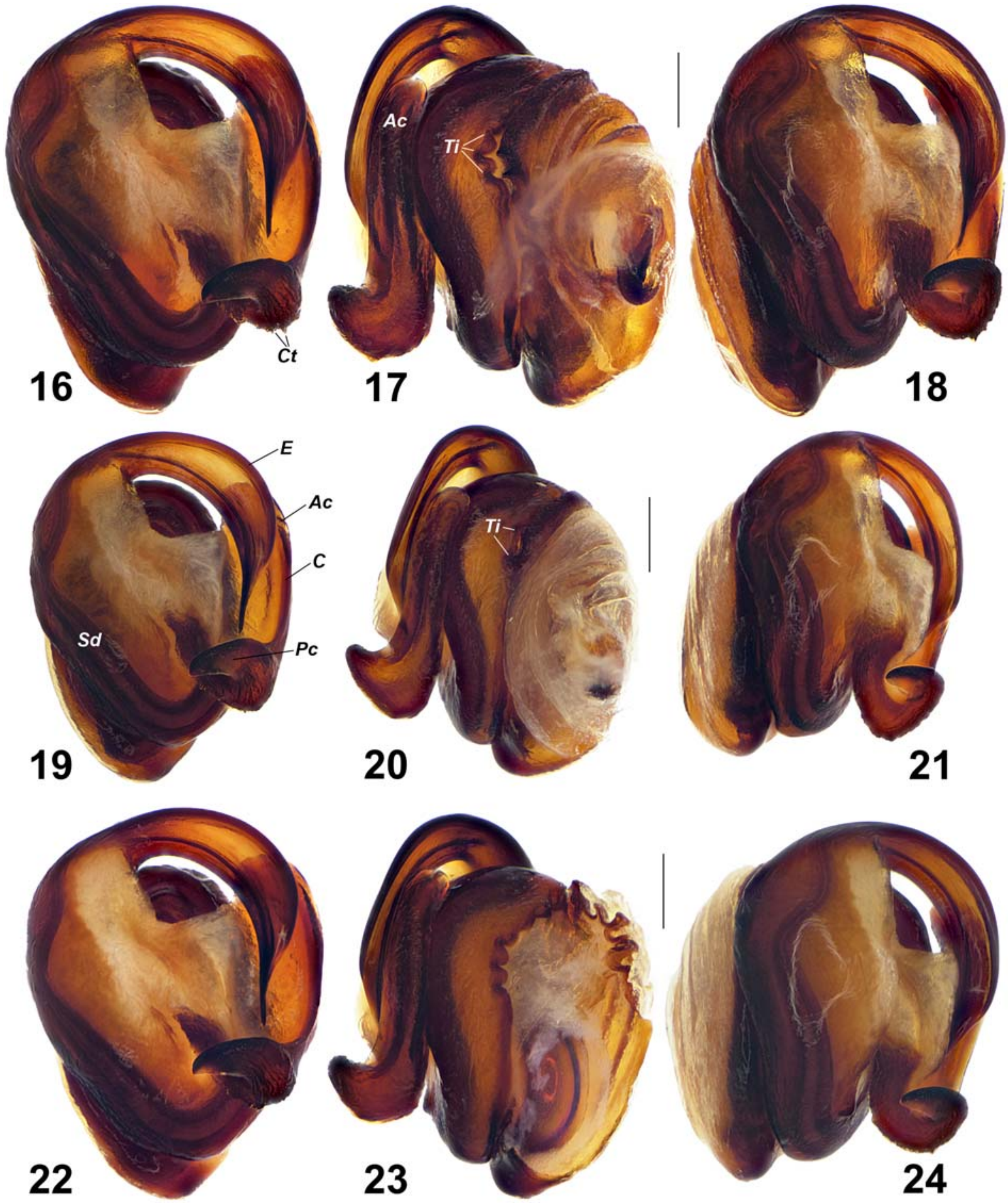
DESCRIPTION. Male (Holotype). Total length 9.67. Carapace: 4.14 long, 2.92 wide. Carapace/femur I length ratio 0.86. Carapace light brown (cephalic area brown) with clearly visible pattern (Fig. 9). Chelicerae uniformly brown. Endites, labium and sternum brown. Sternum with dark brown edges. Chelicerae with 8 teeth on posterior edge and 3 larger ones on anterior (Fig. 15). For spination of leg I see Table 5. Legs with annulations.

Abdomen dorsally gray with brown cardiac mark and contrasting pattern, consisting of light gray spots; lateral sides gray with number of irregular light gray spots; the venter of the abdomen light gray.

Palp as in Figs 10–12, 22–24. Femur length/width ratio 3.95. Femur length/cymbium length ratio 0.84. Patella with subdivided apophysis (*Pa*); ventral part (*Pv*) wide with blunt tip, dorsal part (*Pd*) small, with short spines. Tibia subequal in length to patella with ridge-like *Rta*. Cymbium moderately long, length/width ratio 2.33, its terminal part slightly shorter than length of bulb. Bulb oval 1.34 times longer than wide, 2 times shorter than cymbium. Tegulum with 3 deep incisions retrolaterally (*Ti*, Fig. 23). Anterior arm of conductor (*Ac*) short, terminates at about 1 o'clock position, posterior arm (*Pc*) short and solid, its tip mesoventrally bent with small teeth posteriorly (Fig. 22). Embolus wide, almost as wide as anterior part arm of conductor, gradually tapering

Table 2. Measurements of legs of *Cybaeus logunovi* sp.n. male.
Таблица 2. Промеры ног самца *Cybaeus logunovi* sp.n.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	3.86	1.17	4.26	4.01	1.91	15.21
II	3.53	1.22	3.61	3.7	1.66	13.72
III	2.98	1.11	2.8	3.17	1.49	11.55
IV	3.4	1.12	3.35	4.01	2	13.88



Figs 16–24. Bulbs of *Cybaeus oligerae* sp.n. (16–18), *C. logunovi* sp.n. (19–21) and *C. maritimus* sp.n. (22–24). 16, 19, 22 — ventral; 17, 20, 23 — retrolateral; 18, 21, 24 — prolateral. Scale: 0.2 mm.

Abbreviations: *Ac* — anterior arm of conductor, *C* — conductor, *Ct* — teeth of conductor, *E* — embolus, *Pc* — posterior arm of conductor, *Sd* — sperm duct, *Ti* — tegular incisions.

Рис. 16–24. Бульбусы *Cybaeus oligerae* sp.n. (16–18), *C. logunovi* sp.n. (19–21) и *C. maritimus* sp.n. (22–24). 16, 19, 22 — вентрально; 17, 20, 23 — ретролатерально; 18, 21, 24 — пролатерально. Масштаб: 0,2 мм.

Сокращения: *Ac* — передняя ветвь кондуктора, *C* — кондуктор, *Ct* — зубцы кондуктора, *E* — эмболюс, *Pc* — задняя ветвь кондуктора, *Sd* — семявыносящий проток, *Ti* — вырезы тегулума.

Table 3. Measurements of legs of *Cybaeus maritimus* sp.n. male.
Таблица 3. Промеры ног самца *Cybaeus maritimus* sp.n.

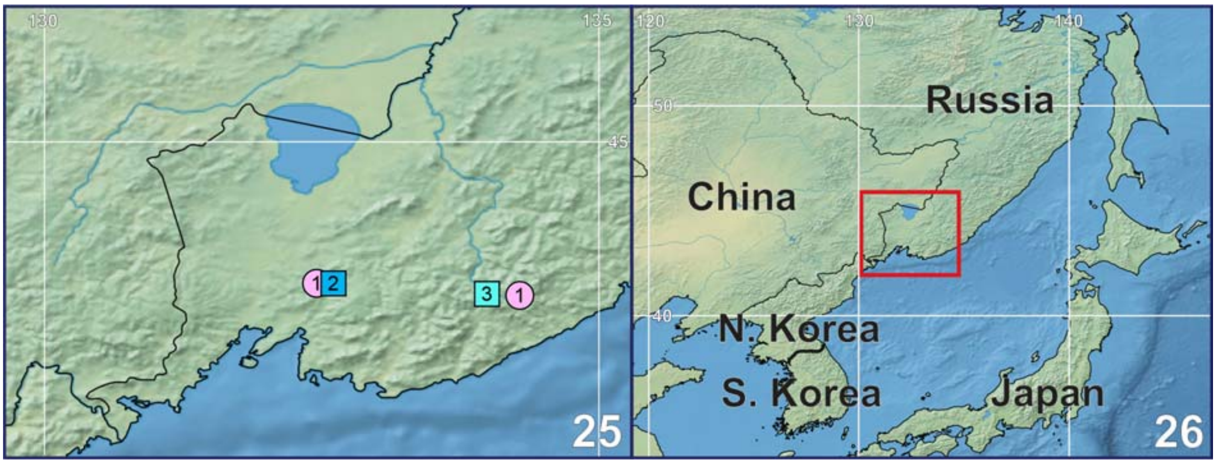
Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	4.79	1.4	5.29	5.06	2.1	18.64
II	4.46	1.49	4.67	4.48	1.97	17.07
III	3.52	1.22	2.99	3.62	1.72	13.07
IV	4.02	1.22	3.75	4.5	2.17	15.66

Table 4. Main measurements of holotypes of new species.
Таблица 4. Основные промеры голотипов новых видов.

	Total length	Carapace length/width	Leg I /carapace length	Legs length (I/II/III/IV)
C. oligerae sp.n.	9.02	5.19/3.62	5.28	27.42.25.49, 17.83, 20.85
C. logunovi sp.n.	7.07	3.56/2.36	4.27	15.21, 13.72, 11.55, 13.88
C. maritimus sp.n.	9.67	4.14/2.92	4.5	18.64, 17.07, 13.07, 15.66

Table 5. Spination of leg I in three new species.
Таблица 5. Вооружение ноги I трех новых видов.

	Femur	Tibia	Metatarsus
C. oligerae sp.n.	3d(2d) 3p 1r(2r)	2p 3-3v	1p 1r 2-2v
C. logunovi sp.n.	3d 3p 1r	1p 3-3v	1p 1r 2-2v
C. maritimus sp.n.	3d 3p 1r	2p 3-3v	1p 1r 2-2v



Figs 25–26. Distribution records of *Cybaeus oligerae* sp.n. (1), *C. logunovi* sp.n. (2) and *C. maritimus* sp.n. (3) in Maritime Province.
Рис. 25–26. Места находок *Cybaeus oligerae* sp.n. (1), *C. logunovi* sp.n. (2) и *C. maritimus* sp.n. (3) в Приморском крае.

with pointed tip, originates at about 11:30 o'clock position and terminates at about 4 o'clock position.

Female unknown.

NOTE. Both palps of the holotype are slightly expanded.

DISTRIBUTION. Type locality only (Figs 25–26).

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